

The Psychology of High Reliability
The State of Mindfulness
Nuclear Safety Workshop June 6, 2011 Washington D.C.
Steve Erhart, Manager, Pantex Site Office

To stimulate thinking and discussion I'll personify two organizations, one deemed "highly reliable" and the other "normal" and contrast how each thinks. To simplify the comparison and avoid controversy, both hypothetical organizations have identical missions, the assembly and disassembly of nuclear weapons

As humans we naturally want things to be better than they currently are and we comfort ourselves by believing things are better than they actually are. This is "normal" thinking and therefore is widespread throughout our illustrative "normal", non-HRO organization where....

Things are going fairly well, they are making their production milestones; they are getting relatively good grades on external ES&H assessments and most certainly close every deficiency promptly. Their worker safety metrics are good and they are extremely proud of their recent VPP certification. They have a fully compliant contractor assurance and self-assessment program and complete all required assessments on schedule and again, close every deficiency promptly. They have a model lessons learned program where they diligently read about how other sites have screwed up and quickly and effortlessly convince themselves their multi-layered, complex processes could never allow a similar fate to befall them.

They have 1243 metrics of which they boast: "we measure everything so we stay on top of everything all the time". When events occur, they are promptly dealt with. Management had recently noticed an upward trend in "reportable events" and has made it known throughout the organization that this upward trend is "unacceptable". As a further sign of their success, the metrics show that the number of reported events has indeed dropped dramatically - another source of pride.

As far as how they think under fire, well they recently actually had a fire and they are very happy to report that it was contained well before it had any effect on any nuclear materials and resulted in zero production delays. They even wrote a big report about it and identified numerous individual deficiencies that they of course are happy to report were promptly closed.

Meanwhile....

at the highly reliable site, things are also going fairly well but you wouldn't necessarily know it....they are currently performing no fewer than five full-scope process reviews. None of these reviews were prompted by external findings or serious events at the site but rather are focused on areas they deemed "information rich". One review was prompted by conducting an analysis of an accident in a totally unrelated field of work.

All include team members across multiple functional areas and one includes membership from multiple sites. All reviews have the same goal, to uncover and correct latent organizational weaknesses while reevaluating, streamlining and simplifying processes that over time have become overly cumbersome and increasingly variable (and therefore less reliable). The team members are fully aware that they will be asked to work together not only to identify problems but to fix them by revamping the process and are actually enthusiastic about it since many things about the status quo has been bugging them for some time.

Management knows that as each team continues, they will invariably find more problems, some of which they may even have to report to HQbut they are willing to go wherever the data takes them. Management has embraced the attitude that it is much better to know than not know and in the long run “confronting the brutal truth” is much healthier than just believing things are fine. They have established a deep trust that runs throughout the organization where people are free , in fact, encouraged to stop and ask questions before continuing if something doesn’t seem right to them. People are rewarded for bringing problems forward even if they were the ones that made the mistake because the organization believes that in each identified problem lies opportunity to learn more about and strengthen their processes further.

They have 100 metrics but replace about 10 per quarter with better ones. Instead of mindlessly closing each deficiency, they prefer to view the deficiency in relation to the entire body of data available to them and look for trends and try and focus their limited energies on identifying potential underlying systemic issues. If necessary they will put a team together to work on those and in so doing sweep up a number of “deficiencies” in the process.

Instead of fighting actual fires, they tend to make relatively “big deals” out of relatively small things. For example, violation of a combustible loading limit or finding ignition sources in prohibited areas. In other words they know of and respect the barriers that are in place to prevent the big events from occurring and take actions on relatively small things so to prevent the bigger events from becoming more likely.

Speaking of big events, they seem to exist in a state of “chronic unease” to expect the unexpected and that low probability, high consequence events can definitely happen...here. They are definitely “proud” of what they do and how they do it but that pride is balanced by the almost daily reckoning that gaps exist between “work as imagined” and “work as performed” and these gaps are not confined to any single part of the operation but are widespread. They also know that since they are a one of a kind operation, the country needs them to stay “online” and that the big events...or “normal accidents” that can take them offline are not just nuclear safety related but could occur in security, quality, environmental and even business areas. This provides another source of humility that there is always more work to do and you never really get “there” (wherever there is) because once you think, or heaven forbid, believe you are there, you cease being mindful.